Wounding and chemical treatment effects on *Drosera capensis* bud formation on leaf cuttings

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Introduction

Drosera capensis L. (Droseraceae) is one of the most commonly grown carnivorous plants prized for its ease of culture and rapid growth. In cultivation, seed is preferred for propagating this species; however, in the case of cultivar propagation, asexual propagation must be used. *D. capensis* readily propagates from both leaf and root cuttings. Leaf cuttings can be used to asexually propagate *D. capensis* (Brittnacher 2011). Wounding and exogenous hormone applications are commonly used in herbaceous and woody plant asexual propagation to enhance adventitious root and shoot formation. The purpose of this study was to investigate the effect of wounding and exogenous hormone application (auxin and cytokinin) on adventitious shoot formation on leaf cuttings of *D. capensis*.

Materials and Methods

The experiment was replicated in three separate flats using a 1:1 peat and milled sphagnum soil mixture. Leaf cuttings were taken from established plants maintained in the N.C. State University conservatory. Leaves used for cuttings were the youngest, fully unfurled leaves. The five treatments in this experiment consisted of an untreated control, two separate wounding treatments, a liquid auxin dip and a liquid cytokinin dip. The first wounding treatment entailed making a slight cut down the middle of the midvein on the adaxial side of the leaf using a single edge razor blade (razor wounding). The second wounding treatment involved poking the adaxial side of the leaf about ten times with a needle in a uniform pattern (needle wounding). For both hormone treatments, leaves were dipped in a solution for 10 seconds and then laid flat on the propagation media. For the auxin and cytokinin treatments, a 100 ppm solution of the potassium salt of indole-3 butyric acid (K-IBA) and 200 ppm solution of N6 benzyladenine (BA) were used, respectively. For the control and all treatments, leaf cuttings were firmly placed on the media, abaxial side down, and placed under a misting regime (6-second duration at 8-minute intervals) in a greenhouse maintained at an average of 75°F. Thirty leaf cuttings (ten per replication) were used for each treatment, divided evenly among three flats. Cuttings were checked weekly, beginning a week after the experiment was initiated. Once plantlets began to form, the cuttings were checked weekly at 3-4 day intervals. Evaluations were based on days until plantlet formation, number of plantlets per leaf, number of plantlets that produced roots, and number of leaves per plantlet.

Results and Discussion

There were no obvious differences between treatments for percentage of leaves that produced at least one adventitious shoot (Fig. 1), except for the K-IBA treatment, which dramatically inhib-

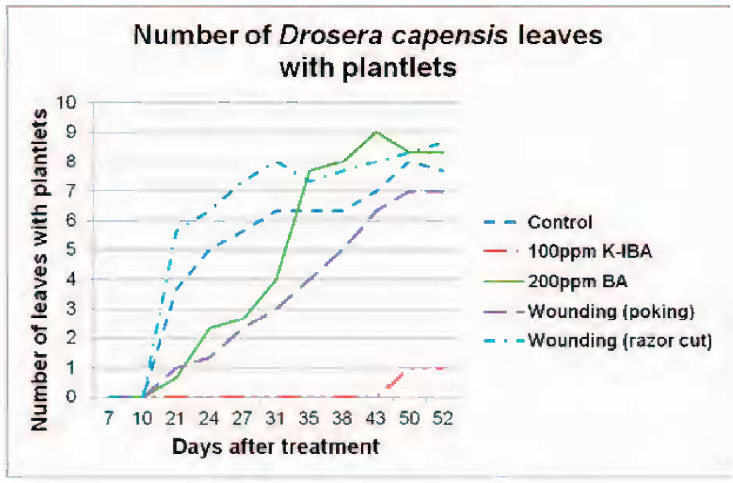

Figure 1: Average number of *D. capensis* leaves that produced at least one adventitious plantlet (out of 10 leaves total per replication). Data represent the mean of 3 replications.

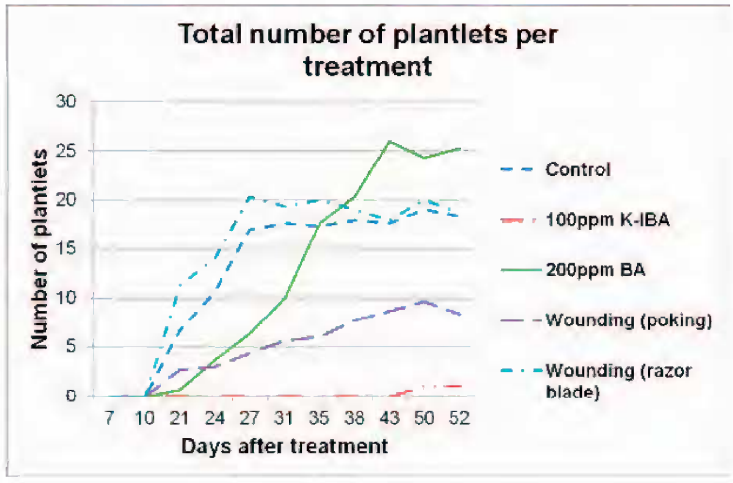

Figure 2: Total number of adventitious plantlets produced on leaves of *D. capensis* (out of 10 leaves total per replication). Data represent the mean of 3 replications.

ited the number of leaves forming plantlets and total plantlet formation. The midvein wounding treatment produced more plantlets per leaf on average than any other treatment up to about week 4, but was only slightly superior to the control treatment response. However, the BA treatment ultimately resulted in more plantlets per leaf at week 6 (Fig. 2) compared to all other treatments. Based on the data from this experiment, wounding by cutting the midvein produces the most plantlets in the least amount of time when compared to the other treatments performed in this experiment, but the BA treatment ultimately promoted the greatest number of plantlets by the end of the experiment. The midrib wounding treatment may be more time and cost effective than is the BA hormone dip treatment.

In order to provide the best yield in a shorter amount of time, removing the plantlets from the leaf cutting and planting them out should be done between three and five weeks after the initial cuttings are taken. This will help increase the number of plantlets that survive versus if the plantlets are left on the leaf cutting. After five weeks, the plantlets began to die as they competed with each other, with an exception in the case of the cytokinin treatment.

During the first three weeks of the treatment, bud proliferation was rapid for all the treatments except the K-IBA treatment. By the end of the third week, many of the buds began to grow their first true leaves and by the end of the fifth week we observed that many of the buds did not become plantlets. This is probably due to the excess of algae and fungal growth on the media surrounding the cuttings.

Conclusion

Result of this experiment show that wounding leaves of *D. capensis* Broadleaf form by cutting down the midvein led to a greater proliferation of plantlets than any of the other treatments in five weeks. Based on the data, wounding the midvein of the leaf produced a budding response for leaf cuttings of *D. capensis* Broadleaf form, but more research is needed to confirm this conclusively. After five weeks this experiment showed that a BA hormone dip greatly increases the number of plantlets produced. In future experiments it would be good for researchers to test wounding only the midrib versus the entire leaf surface. It would also be suggested to research the effects of different types of propagation media to determine whether the media was a limiting factor for this experiment or if this propagation method would produce the same response in other species of *Drosera*.

References

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